Synapse
Energy Economics, Inc.

Electricity Regulatory Reforms to Encourage Energy Efficiency:What Air Regulators and Energy Officials Need to Know

DOE Web Conference

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Presented by Chris James and Doug Hurley

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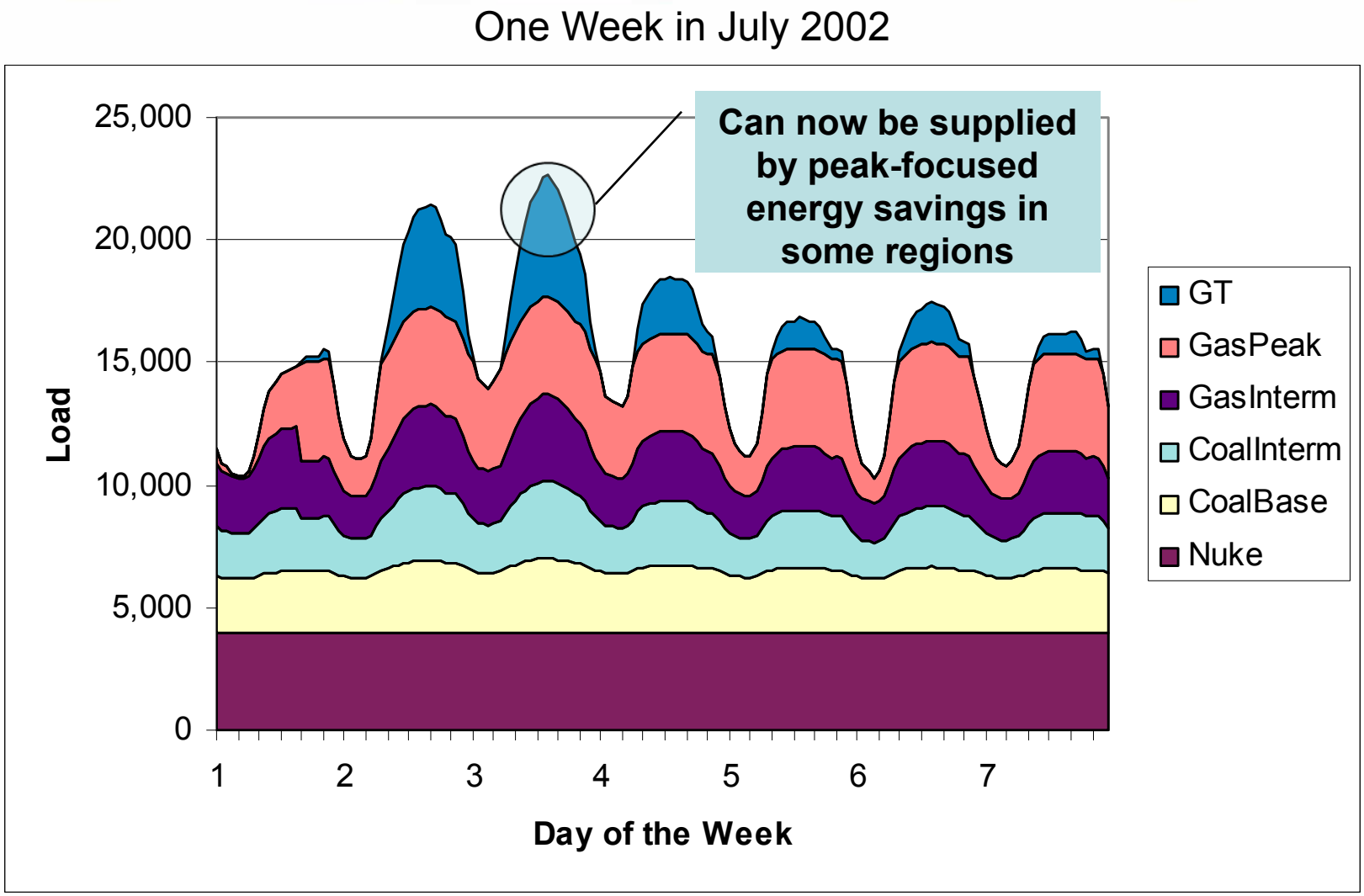
Overview

- Introduction
- Regional Electricity Market Reforms
- National and State Reform Efforts

Role of EE in Air Programs

- EE is #1 policy measure that states are using to reduce GHG emissions
- EE cost of saved energy is 3-3.5c/kWh (much less than cost of new generation)
- Improved policy coordination between air and energy regulators will ensure that EE measures are:
  - integrated into SIPs to help attain and maintain compliance with EPA air quality standards
  - Ensure that state policies encourage participation in regional EE markets, and link state goals with regional markets
  - Accurately characterized in resource plans
  - Avoid adverse effects on air quality

Capacity Markets



Efficiency in Capacity Markets

- Without markets, annual energy savings is the primary financial driver of efficiency
- Capacity Markets target High Electric Demand Days
- Efficiency can provide reliability at lower cost and reduced emissions
- Good market design requires participation by air and energy regulators

Forward Capacity Market (FCM)

Summer Before Auction Year
Peak Loads used to forecast need in Delivery Year

Auction Year
New and existing resources bid to provide capacity in Delivery Year. Efficiency and Demand Response compete with traditional generation in the auction.

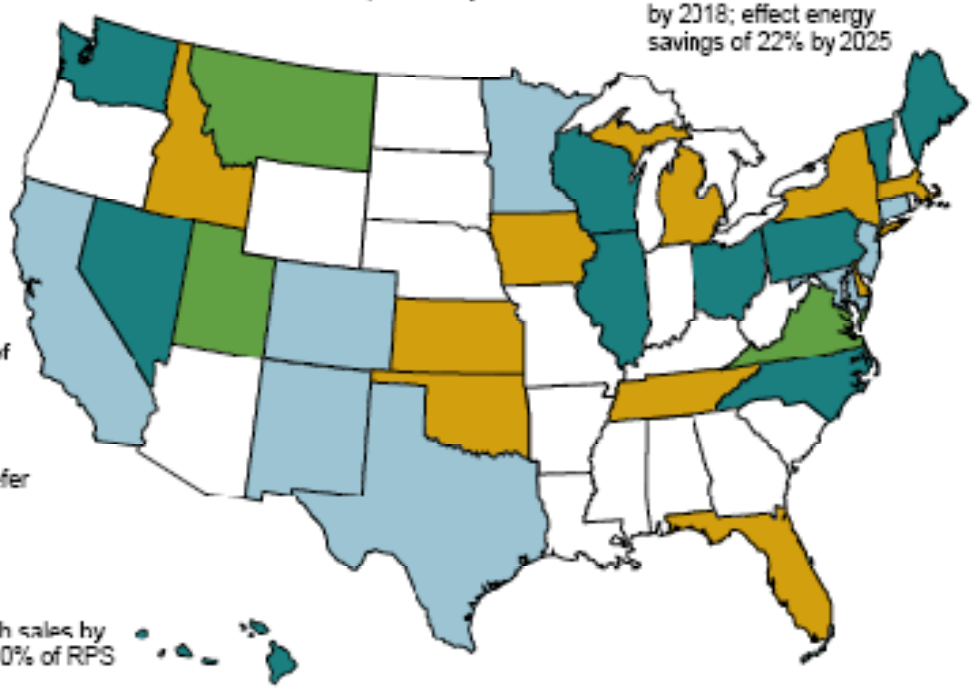
3 year interim period. Cleared new resources finish permitting, construct, and become operational.

Delivery Year. All New and Existing resources that cleared in the auction must deliver ***during peak hours***. Financial penalties for non-delivery.

Note: A Transition Period determines prices and participation for the first three years.

Energy Efficiency Resource Standards

FERC 2008



WA: must pursue all cost-effective conservation

CA: IOUs reduce MW 10%, peak demand (MWh) 12% by 2013; munis 10% by 2017

NV: use EE for up to 25% of RPS by 2015

UT: EE incentives in RPS goal

CO: save 40 MW and 100 GWh annually to 2013

NM: use EE and DR to save 10% of '05 retail electric sales by 2020

KS: studying for E&G utilities

OK: implement DSM and EE to defer or avoid new plant construction

TX: 10% of load growth, beyond 2004, based on prior 5 years

HI: 20% of MWh sales by 2020; up to 50% of RPS

ID: evaluating DR, EE, and RE as priority resources

MT: state agency reduction initiative: save 20% by 2010

MN: reduce fossil fuel use 15% by 2015 through EE, RE

IA: mandated study

WI: RPS requires utility EE

MI: incremental savings beginning in 2009, increasing to 2012

IL: use cost-effective EE, DR to reduce energy 2% by 2015

OH: reduce peak-demand 8% by 2018; effect energy savings of 22% by 2025

ME: 10% new EE by 2017; in RPS goal as 2nd priority

VT EE & RE to meet 2007-12 growth; new EE fund

MA: pending bill - acquire all cost-effective resources

NY: goal - reduce 15% of forecast energy use by 2015

CT: 4% savings by 2010, and a Tier III RPS resource

PA: pending bills – EE savings of 2.5% by '13; new EE fund

NJ: reduce energy consumption 20% by 2020 using EE, DR, CHP; reduce peak 5,700 MW by 2020

MD: reduce peak-demand and per cap electricity use 15% by 2015

DE: promote EE and conservation by a Sustainable Energy Utility

VA: reduce 10% of 2006 sales by 2022 with EE, DR

NC: EE to meet up to 25% of RPS to 2011; later to 40%

TVA: encourages customers to save 1200 MW per day 2008-2012

FL: Law directs PSC to adopt goals to reduce electric consumption and peak demand by EE and DR

EERS by regulation or law (separate from RPS)

Energy efficiency part of an RPS rule or goal

Voluntary standards (in or out of RPS)

Energy efficiency goal proposed / being studied

Abbreviations: CHP – Combined heat & power; DR - demand response; DSM - demand side management; EE - energy efficiency; E&G: electric and gas utilities; RPS: Renewable Portfolio Standard

Sources: ACEEE, EPA, Regulatory Assistance Project, Union of Concerned Scientists, State legislative sites, trade press

State EE Goals

- All the goals on the previous page are great, but…
- Without air and energy regulator coordination, they won't be met
- Little evidence that goals encourage or require collaboration between air and energy regulators
- How could these EE goals be linked with new air standards? I.e. new 8-hour ozone standard (which will require additional reductions)
- Regional and state electricity market rules should encourage these state efficiency and climate goals

EE in Northeast Power Market

- 660 MW of EE by June 2010
  - Another 150 - 200 MW expected by June 2011
  - Would be nearly 3% of forecasted peak load
  - Can replace generation in the auction if lower bid
- Must pre-qualify for auction with approved Measurement & Verification plan
- Paid for performance in peak hours only (capacity market)
- Financial penalties for non-performance
- Participation by both private companies and state-funded programs
  - Capacity market revenues can help offset cost of state programs

Opportunities in PJM

- PJM is engaged in stakeholder process today. Results may lead to EE being considered as equal resource to supply side.
- PJM is similar to ISO-NE on peak; PJM has not restricted operation of diesel generators
- Air and energy regulators can weigh in to:
  - Require EE to be treated equally with other resources;
  - Restrict operation of diesels and other inefficient supply

State Actions

- Pursue all Cost-Effective EE as a priority
- Align Utility $ Incentives Equally for EE and Supply
- Establish Cost-Effectiveness Tests
- Establish Evaluation, Measurement, and Verification Mechanisms
- Establish Effective EE Delivery Mechanisms
- Develop State Policies to Ensure Robust EE Practices
- Align Customer Pricing and Incentives to Encourage EE Investment
- Establish Advanced Billing Systems
- Implement Advanced Efficiency Information Sharing and Delivery Systems
- Implement Advanced Technologies

EE Provides Benefits Beyond Those to Customers

- Lower energy bills
- Greater customer control and customer satisfaction.
- Lower cost than conventional supplies
- Quick to deploy.
- Significant energy savings
- Environmental benefits
- Economic development
- Energy security

Examples of Best State Practices

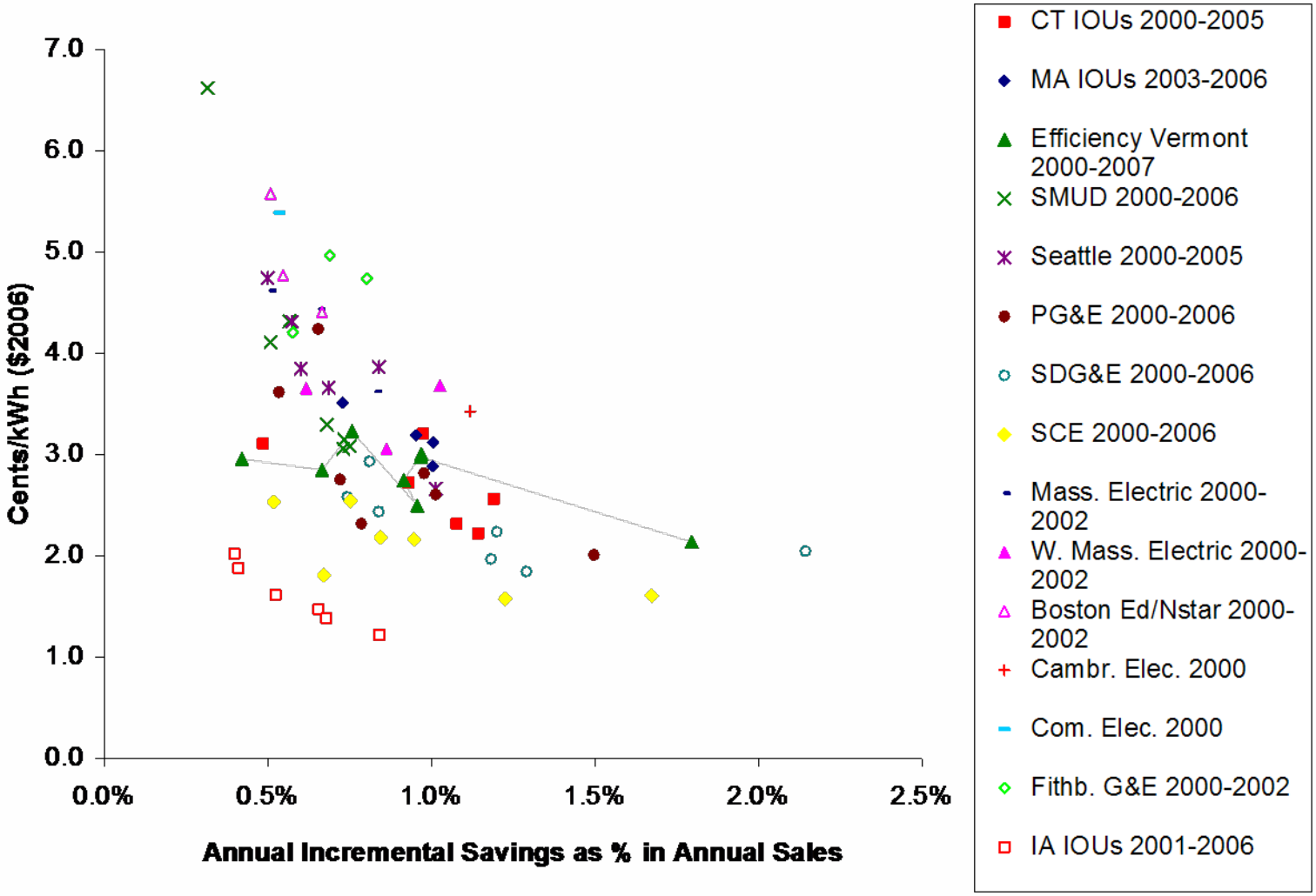
- **Energy portfolio standards:** Establish quantitative and enforceable goals for energy efficiency, renewable energy, and/or CHP.
- **Lead by example:** Establish guidelines for government agencies to follow such as building energy performance standards, energy efficiency procurement policies, and renewable energy purchase requirements.
- **Tax incentives:** Promote clean energy investment through personal or corporate income tax credits, tax reductions or exemptions, or tax deductions.
- **Public benefits funds:** Creating clean energy funding mechanisms such as public benefits funds that entail a small per-kWh charge on customer electric bills to fund grants, loans, rebates, technical assistance, and other strategies for enhancing clean energy investment

Additional Examples of Best State Practices

- **Utility incentives:** Develop regulatory structures to promote utility investment in clean energy programs, such as mechanisms for program cost recovery, revenue stability, and performance-based incentives.
- **Standby rates:** Promote utility rate structures that ensure appropriate cost recovery for utilities but preclude practices that inhibit investment in clean DG (e.g., excessive rates for supplying backup power, high standby connection charges, and exit fees).
- **Interconnection requirements:** Establish uniform rules, processes, and technical requirements for connecting DG applications to the grid, ensuring that such requirements are commensurate with the size, nature, and scope of the DG project.
- **Infrastructure development:** Facilitate deployment of technologies that support demand response, such as advanced metering and communications infrastructure, automated load control devices, and energy management systems.

Cost of Saved Energy

Evidence shows 1+% savings being achieved at costs of less than 3-3.5 c/kWh



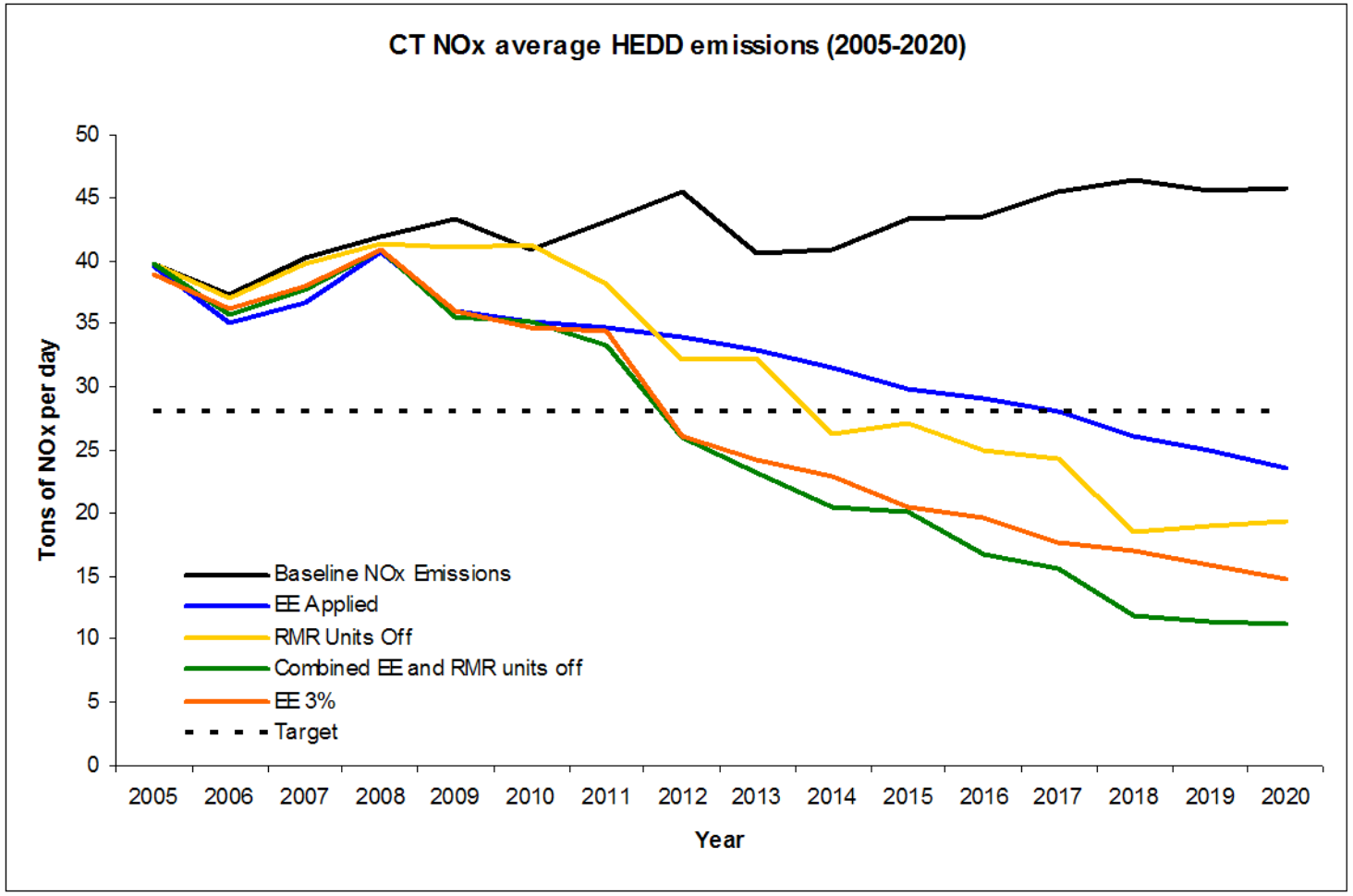
Savings through State Efficiency Programs

Table 2. Selected Results Reported by State Efficiency Programs

State	Year	Annual Spending (Million)	Annual Energy Savings		Annual Air Emission Reductions (Tons)			Cumulative Benefit : Cost Ratio
			Electricity (MWh)	Natural Gas (Dth)	NO_x	SO_x	CO_2	
NY	2006 (8th)	$172	2,360,000		2,000	3,640	1,555,000	3.2
VT	2005 (6th)	$15	248,000				200,000 (est.)	1.7
OR	2005 (4th)	$54	972,000	282,000				3.2
WI	2006 (4th)	$40	931,000	4,700,000	1,000	2,140	842,000	2.4
MF	2006 (3rd)	$9	121,000		67	180	290,000	2.0
NJ	2005 (5th)	$125	1,216,000	2,050,000	1,590	3,500	923,000	2.7

Source: Nichols, David et al. "Independent Administration of Energy Efficiency Programs: A Model for North Carolina". Synapse Energy Economics. April 2007. www.synapse-energy.com.

Example of EE Helping to Reduce Criteria Pollutant Emissions



Note: RMR = Reliability Must Run. Units retained by the ISO-NE for reliability despite their desire to retire.

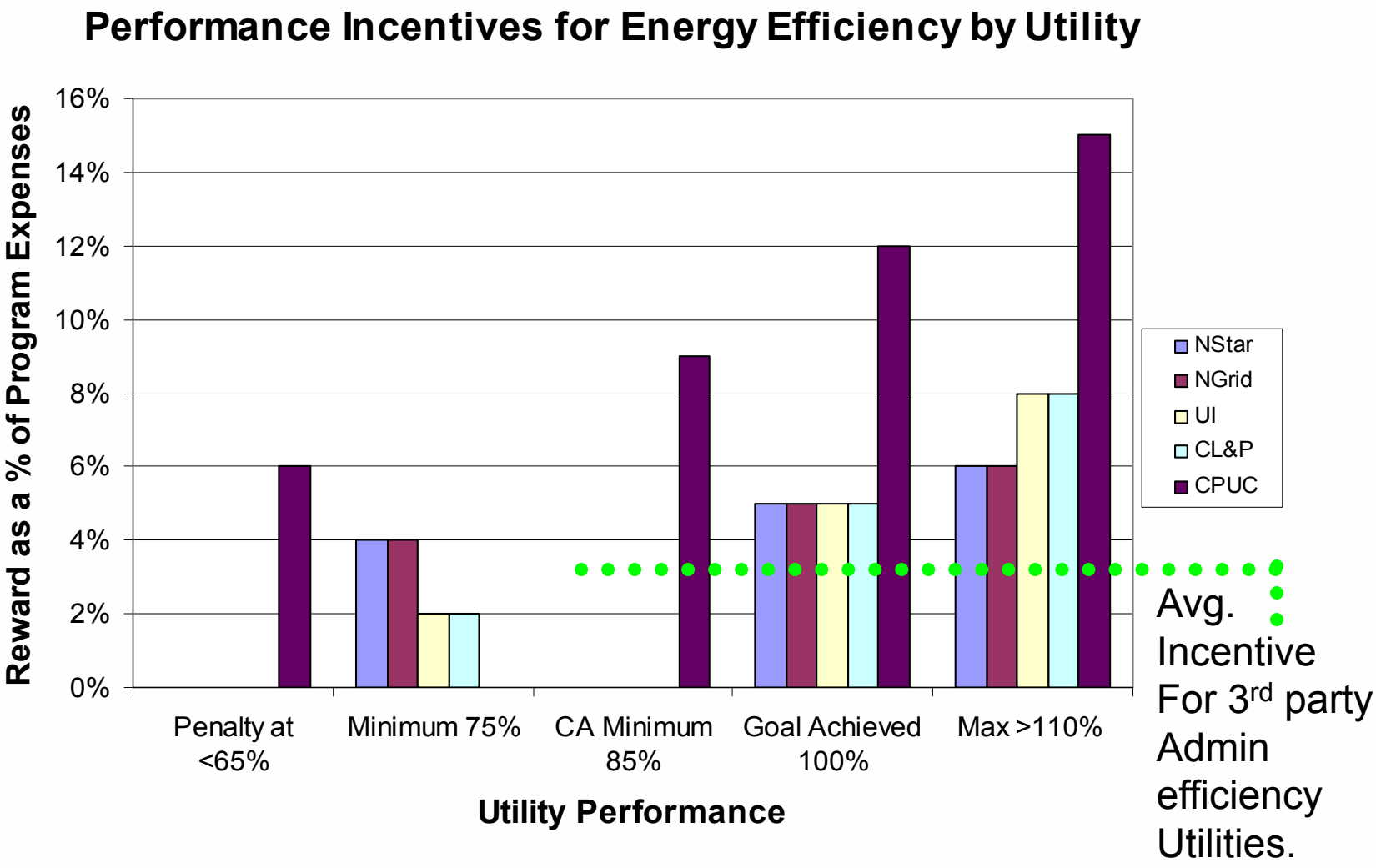
Conclusions

- State and regional policies are demonstrating EE as a resource
- To fully achieve goals, and to avoid additional costs being passed through to ratepayers, state air and energy regulators need to:
  - Actively participate in policy implementation;
  - Participate in each other's respective dockets and hearings
  - Integrate air policies into energy plans and energy policies into air plans

Additional Material

- Additional details and references are provided in the following slides:
- Performance incentives
- Structure of EE boards
- Example of CT EE effect on load
- Excerpt from National Action Plan for EE
- Demand Resources in ISO-NE

Utility Performance Incentives



Energy Efficiency in Regulated Utilities

Considerations:

1) Rate structure – will reduced sales erode utility revenues?
2) Remove the disincentive by 'Decoupling' sales from revenues, or other means to account for utility's *Direct Cost* and *Lost Revenues*
3) Create financial incentives to reduce electric sales
    a. Shared savings mechanism
    b. Return-on-equity Adder
    c. Performance Incentive

Energy Efficiency Utilities – Another Approach

- Ratepayer-funded non-profit organization directed to capture cost-effective energy efficiency improvements
- Benefits
  - One motive: Reduce energy consumption
  - Opportunity to gain efficiency in other fuels
  - Single point of contact for all efficiency avoids customer confusion and saves on installation costs
- States: Vermont, Oregon, Wisconsin, Delaware, Maine, New York, New Jersey

Approaches to Independent Efficiency Utilities

Table 1. State Institutional Approaches to Administering Efficiency Programs

State	Year Decided	Decision Type	Governmental Oversight	Contract Administration	Program Management	Scope
NY	1996	Order	Commission	NYS Energy Research & Development Authority (NYSERDA)	NYSERDA and several contractors	Primarily electricity
VT	1999	Statute, then Order	Commission	Independent Administrator	Efficiency Vermont (NGO)	Primarily electricity
OR	1999	Statute, then Order	Commission	Commission	Energy Trust of Oregon (NGO)	Electricity; gas added
WI Phase I	1999	Statute	Legislature	Department of Administration	WI Energy Conservation Corp. (WECC; NGO)	Electricity and gas
WI Phase II	2006	Statute	Commission	Utility Consortium	WECC (through 2008)	Electricity and gas
ME	2002	Statute	Commission	Commission	Several contractors	Electricity
NJ	2003	Order	Commission	Commission	Several contractors	Electricity and gas

Source: Nichols, David et al. "Independent Administration of Energy Efficiency Programs: A Model for North Carolina". Synapse Energy Economics. April 2007. www.synapse-energy.com.

Efficiency Vermont

- Funded by separate charge on electric bill
- Projects administered by Vermont Energy Investment Corporation; Verified and Reviewed by Vermont Public Service Board
- 3.5% of VEIC's reimbursable costs are withheld until energy savings are delivered.
- VEIC receives no additional rewards or incentives for meeting targets.

Sustainable Energy Utility - Delaware

- First SEU in the country – includes efficient and renewable energy procurement.
- Tax-exempt bonds will fund capital through a private non-profit utility. Other utilities can join and earn a return on investment in energy efficiency projects through the SEU. Small increase in system-benefits charge will fund energy efficiency projects.

Energy Efficiency Programs in Wisconsin

- WI Act 141 required utilities to set 1.2% of revenues aside to fund efficiency programs.
- Commission oversees Utility contracts for statewide program management services.
- Program Administrators can be ‘for profit’. Joint-utility entity formed to solicit projects.
- It is expected that service companies will implement projects.

Utility Performance Incentives

- NSTAR
  - 5% of Energy Efficiency program expenses ($2.3 million based on $45 million program budget, or $2.5 million if 110% exemplary performance is achieved)
- National Grid
  - 5% of Energy Efficiency program expenses ($2.7 million based on $54 million budget or $3 million for 110% if exemplary performance is achieved.)
- CL&P
  - 8% Return on DSM expenditures
- CPUC
  - Minimum Performance - 9% net benefits of portfolio*
  - 100% or above Commission's Goal 12%
  - $450 million cap

*Net benefit calculation is based on verified energy savings evaluated independently by the Commission

Efficiency Utility Performance Incentives

- Vermont: 3.5% of reimbursable expenses withheld until savings delivered
- Oregon: Incentives given to Trade Allies on per project basis
- Delaware: Penalty if <80% savings achieved; reward if >120% savings achieved
- Wisconsin:

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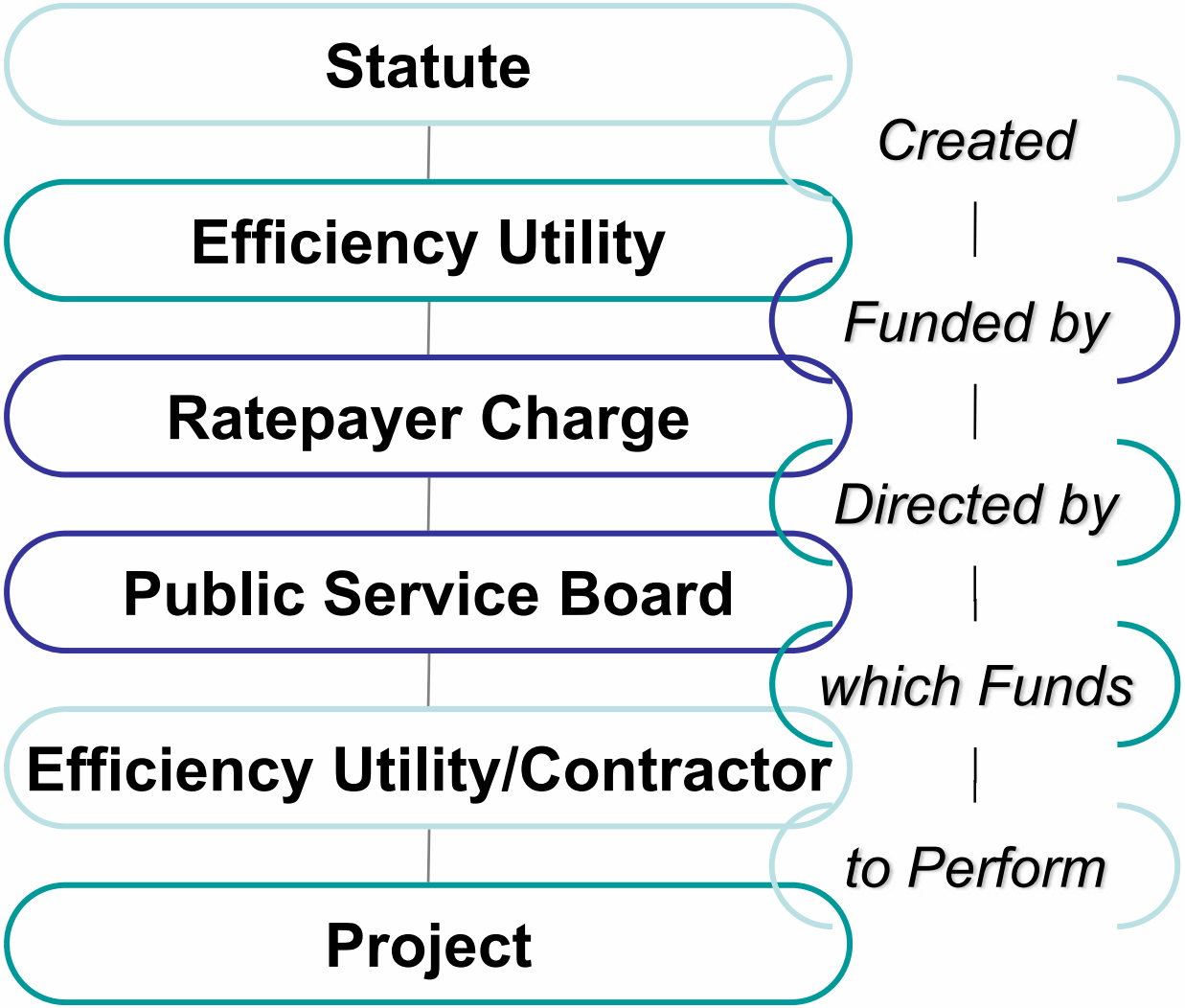
Efficiency Utility Structures



Efficiency Vermont

Efficiency Vermont and Gaz Metro

- In 2007 the Quebec utility Gaz Metro acquired Green Mountain Power through it's US subsidiary Northern New England Energy Corporation
- VT ratepayers earn 50% of above-book proceeds of merger ($8 million) for energy efficiency projects administered by VEIC over seven years.

National Action Plan Leadership Group Recommendations Applicable to Energy Efficiency Program Best Practices

- Recognize energy efficiency as a high priority energy resource.

- Make a strong, long-term commitment to cost-effective energy efficiency as a resource.

- Broadly communicate the benefits of, and opportunities for, energy efficiency.

- Provide sufficient and stable program funding to deliver energy efficiency where cost-effective.

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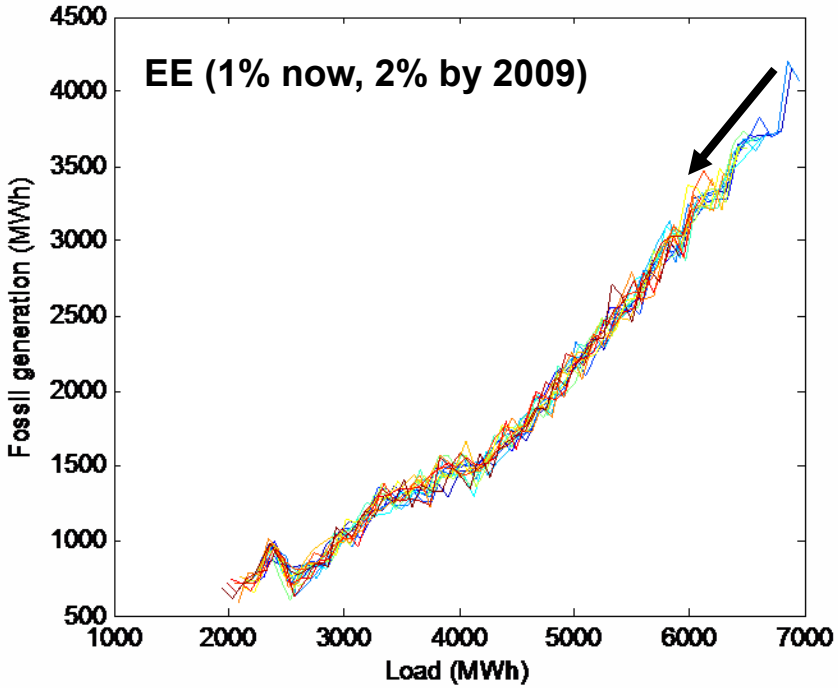
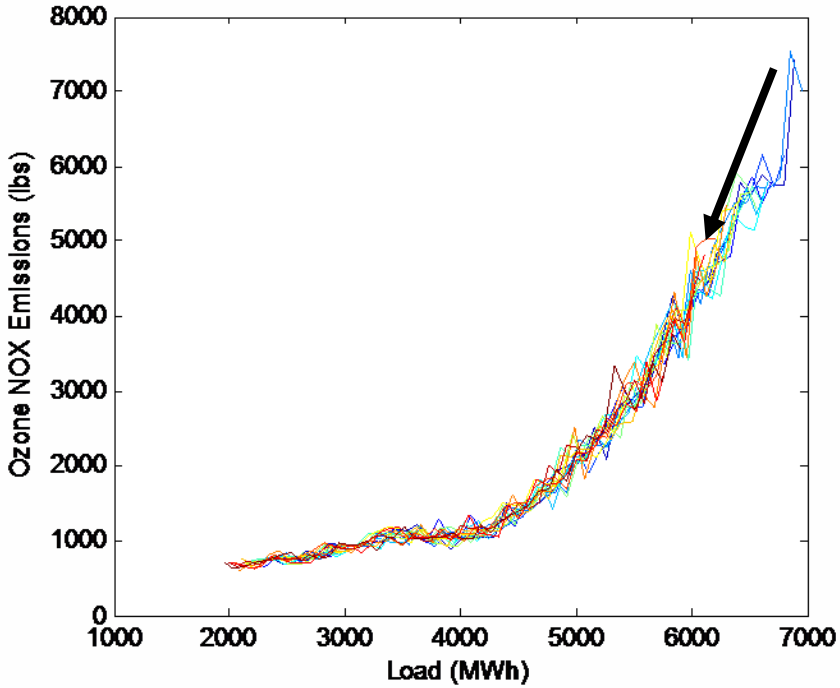
CT Load Modeled with EE

- EE reduces required generation and reduces peak emissions





Citations

- Performance Incentives
  - NSTAR
    - D.P.U. 07-55 Petition of NSTAR Electric Company, pursuant to G.L. c. 25, § 19, G.L. c. 25A, § 11G and G.L. c. 164, § 17A, for approval by the Department of Public Utilities of its 2007 Energy Efficiency Plan National Grid
  - National Grid
    - DPU 07-048 Joint Petition of Massachusetts Electric Company and Nantucket Electric Company, d/b/a National Grid, pursuant to G.L. c. 25, § 19 and G.L. c. 25A, § 11G, for approval of its 2007 Energy Efficiency Plan
  - CL&P
    - Richard Steves, Chair CEAB
  - CPUC
    - Decision 07-10-032 October 18, 2007 INTERIM OPINION ON ISSUES RELATING TO FUTURE SAVINGS GOALS AND PROGRAM PLANNING FOR 2009-2011 ENERGY EFFICIENCY AND BEYOND. Section 7. See http://docs.cpuc.ca.gov/published/FINAL_DECISION/74107.htm

Demand Resources in ISO-NE